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| Product Description: T315XW02 TFT-LCD PANEL with RoHS Guarantee | |
|---|---|
| AUO Model Name: T315XW02 VU | |
| Customer Part No/Project Name: | |
| Customer Signature / Date | AUO / Date |
| | Approved By: PM Director/ Frank Hsu |
| | Reviewed By: RD Director/ Eugene Chen<br>Reviewed By: Project Leader/ Covey Lee |
| | Prepared By: PM/ Marcus Lai |

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**Document Version : 0.2**
**Date : 2008/11/16**

# Product Specifications

## 31.5” WXGA Color TFT-LCD Module
## Model Name: T315XW02 VU

( ) Preliminary Specifications
(*) Final Specifications

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# Record of Revision

| Version | Date | No | Old Description | New Description | Remark |
|---|---|---|---|---|---|
| 0 | 2008/10/01 | | First issue | | |
| 0.1 | 2008/10/30 | 11~13 | Update LIPS spec | | |
| 0.2 | 2008/11/16 | 7 | VTH: min=100<br>VTL: min=100 | VTH: Max=100<br>VTL: min= -100 | update |
| | | 11 | PWM Operating Frequency Min=140 | PWM Operating Frequency Min=120 | update |
| | | 15 | | Update Timing table of vertical frequency | update |
| | | 22 | Weight=6000g | Weight=5900g | update |
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# 1. General Description

This specification applies to the 31.51 inch Color TFT-LCD Module T315XW02 VU. This LCD module has a TFT active matrix type liquid crystal panel 1366x768 pixels, and diagonal size of 31.51 inch. This module supports 1366x768 XGA-WIDE mode (Non-interlace).

Each pixel is divided into Red, Green and Blue sub-pixels or dots which are arranged in vertical stripes. Gray scale or the brightness of the sub-pixel color is determined with a 8-bit gray scale signal for each dot.

The T315XW02 VU has been designed to apply the 8-bit 1 channel LVDS interface method. It is intended to support displays where high brightness, wide viewing angle, high color saturation, and high color depth are very important.

The T315XW02 VU model is RoHS verified which can be distinguished on panel label.

## * General Information

| Items | Specification | Unit | Note |
|---|---|---|---|
| Active Screen Size | 31.51 inches | | |
| Display Area | 697.685 (H) x 392.256(V) | mm | |
| Outline Dimension | 760.0(H) x 450.0(V) x 45(D) | mm | |
| Driver Element | a-Si TFT active matrix | | |
| Display Colors | 16.7M | Colors | |
| Number of Pixels | 1366 x 768 | Pixel | |
| Pixel Pitch | 0.51075 | mm | |
| Pixel Arrangement | RGB vertical stripe | | |
| Display Mode | Normally Black | | |
| Surface Treatment | Anti-Glare, 3H | | Haze =11% |

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## 2. Absolute Maximum Ratings

The following are maximum values which, if exceeded, may cause permanent damage to the unit.

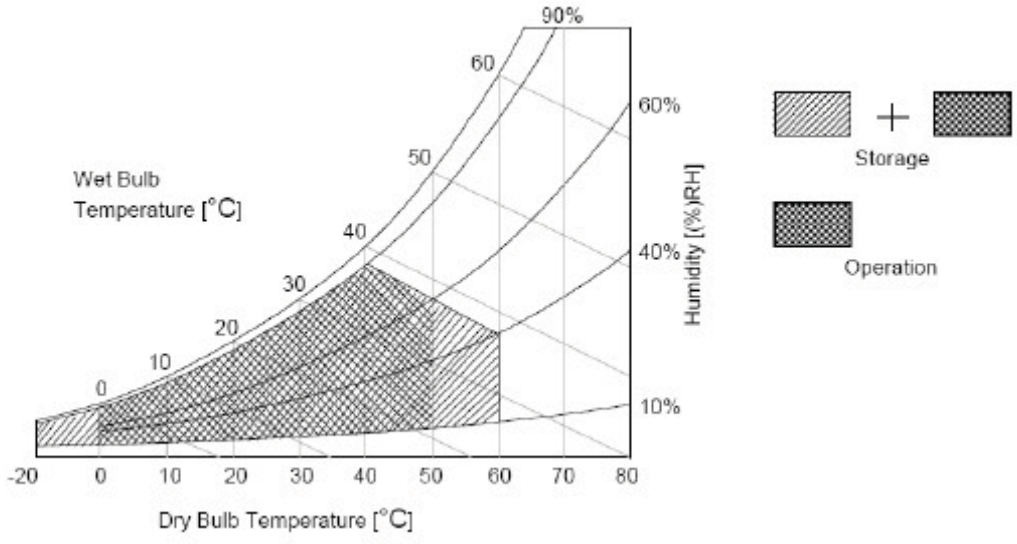
| Item | Symbol | Min | Max | Unit | Conditions |
|---|---|---|---|---|---|
| Logic/LCD Drive Voltage | Vcc | -0.3 | 14 | [Volt] | Note 1 |
| Input Voltage of Signal | Vin | -0.3 | 3.6 | [Volt] | Note 1 |
| BLU Input Voltage | VDDB | -0.3 | 28 | [Volt] | Note 1 |
| BLU Brightness Control Voltage | Vdim | -0.3 | 7.0 | [Volt] | Note 1 |
| Operating Temperature | TOP | 0 | +50 | [°C] | Note 2 |
| Operating Humidity | HOP | 10 | 90 | [%RH] | Note 2 |
| Storage Temperature | TST | -20 | +60 | [°C] | Note 2 |
| Storage Humidity | HST | 10 | 90 | [%RH] | Note 2 |
| Panel Surface Temperature | PST | | 65 | [°C] | Note 3 |

Note 1: Duration:50 msec.

Note 2 : Maximum Wet-Bulb should be 39℃ and No condensation.

The relative humidity must not exceed 90% non-condensing at temperatures of 40℃ or less. At temperatures greater than 40℃, the wet bulb temperature must not exceed 39℃.

Note 3 : Surface temperature is measured at 50℃ Dry condition

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# 3. Electrical Specification

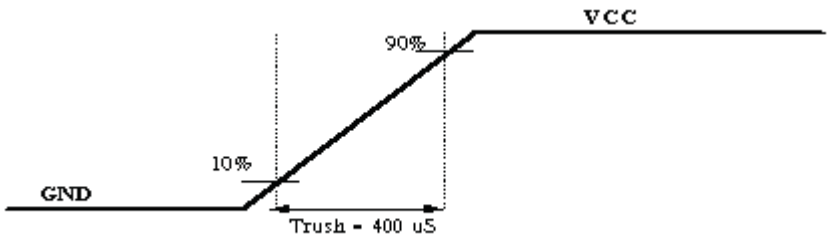
The T315XW02 VU requires two power inputs. One is employed to power the LCD electronics and to drive the TFT array and liquid crystal. The second input power for the BLU, is to power inverter..

## 3-1 Electrical Characteristics

| Parameter | | Symbol | Values | | | Unit | Notes |
|---|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | | |
| LCD: | | | | | | | |
| Power Supply Input Voltage | | Vcc | 10.8 | 12 | 13.2 | Vdc | 1 |
| Power Supply Input Current | | Icc | - | 0.45 | 0.55 | A | 2 |
| Power Consumption | | Pc | - | 5.4 | 7.26 | Watt | 2 |
| Inrush Current | | $I_{RUSH}$ | - | - | 6 | Apeak | 3 |
| LVDS Interface | Differential Input High Threshold Voltage | VTH | - | - | 100 | mV | 4 |
| | Differential Input Low Threshold Voltage | VTL | -100 | - | - | mV | 4 |
| | Common Input Voltage | VCIM | 1.10 | 1.25 | 1.40 | V | 4 |
| CMOS Interface | Input High Threshold Voltage | VIH (High) | 2.4 | | 3.3 | Vdc | |
| | Input Low Threshold Voltage | VIL (Low) | 0 | | 0.7 | Vdc | |
| Life Time | | | 50,000 | | | Hours | 5,6,7,8 |

**Note :**

1. The ripple voltage should be controlled under 10% of $V_{CC}$
2. Vcc=12.0V, $f_v$ =60Hz, fCLK=81.5Mhz , 25℃, Test Pattern : White Pattern
3. Measurement condition :

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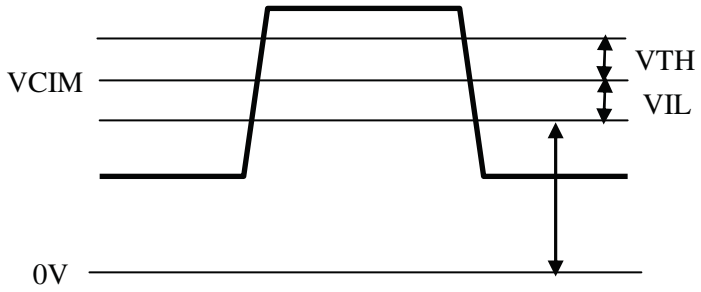
4. VCIM = 1.2V




5. The performance of the Lamp in LCD panel, for example life time or brightness, is extremely influenced by the characteristics of the DC-AC Inverter. So all the parameters of an inverter should be carefully designed as not to produce too much leakage current from high-voltage output of the inverter. When you design or order the inverter, please make sure unwanted lighting caused by the mismatch of the lamp and the inverter (no lighting, flicker, etc) never occurs. After confirmation, the LCD panel should be operated in the same condition as installed in your instrument.
6. Do not attach a conducting tape to lamp connecting wire. If the lamp wire attach to conducting tape, TFT-LCD Module have a low luminance and the inverter has abnormal action because leakage current occurs between lamp wire and conducting tape.
7. The relative humidity must not exceed 80% non-condensing at temperatures of 40℃ or less. At temperatures greater than 40℃, the wet bulb temperature must not exceed 39℃. When operate at low temperatures, the brightness of CCFL will drop and the life time of CCFL will be reduced.
8. Specified values are for a single lamp only which is aligned horizontally. The lifetime is defined as the time which luminance of the lamp is 50% compared to its original value.
   [Operating condition: Continuous operating at Ta = 25±2℃]

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## 3-2 Interface Connections

- Connector on Panel: **093G30-B0001A-1** (Manufactured by Starconn)

| Pin No | Symbol | Description | Default |
|---|---|---|---|
| 1 | VCC | +12V, DC, Regulated | |
| 2 | VCC | +12V, DC, Regulated | |
| 3 | VCC | +12V, DC, Regulated | |
| 4 | VCC | +12V, DC, Regulated | |
| 5 | GND | Ground and Signal Return | |
| 6 | GND | Ground and Signal Return | |
| 7 | GND | Ground and Signal Return | |
| 8 | GND | Ground and Signal Return | |
| 9 | LVDS Option | Low/Open for Normal (NS), High for JEIDA | NS mode |
| 10 | Reserved | Open | AUO internal test |
| 11 | GND | Ground and Signal Return for LVDS | |
| 12 | RIN0- | LVDS Channel 0 negative | |
| 13 | RIN0+ | LVDS Channel 0 positive | |
| 14 | GND | Ground and Signal Return for LVDS | |
| 15 | RIN1- | LVDS Channel 1 negative | |
| 16 | RIN1+ | LVDS Channel 1 positive | |
| 17 | GND | Ground and Signal Return for LVDS | |
| 18 | RIN2- | LVDS Channel 2 negative | |
| 19 | RIN2+ | LVDS Channel 2 positive | |
| 20 | GND | Ground and Signal Return for LVDS | |
| 21 | RCLK- | LVDS Clock negative | |
| 22 | RCLK+ | LVDS Clock positive | |
| 23 | GND | Ground and Signal Return for LVDS | |
| 24 | RIN3- | LVDS Channel 3 negative | |
| 25 | RIN3+ | LVDS Channel 3 positive | |
| 26 | GND | Ground and Signal Return for LVDS | |
| 27 | Reserved | Open or High | AUO internal test |
| 28 | Reserved | Open or High | AUO internal test |
| 29 | GND | Ground and Signal Return | |
| 30 | GND | Ground and Signal Return | |

**Note:**

1. All GND (ground) pins should be connected together and should also be connected to the LCD's metal frame. All Vcc (power input) pins should be connected together.
2. For Pin 10, 27 and 28, panel will not damage if negligently connect these pins to high or low

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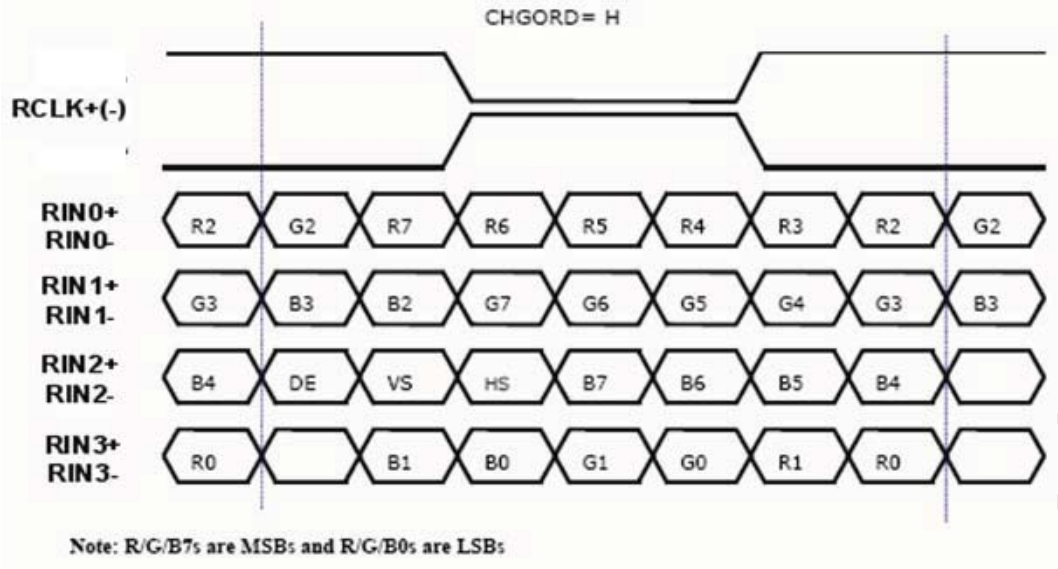
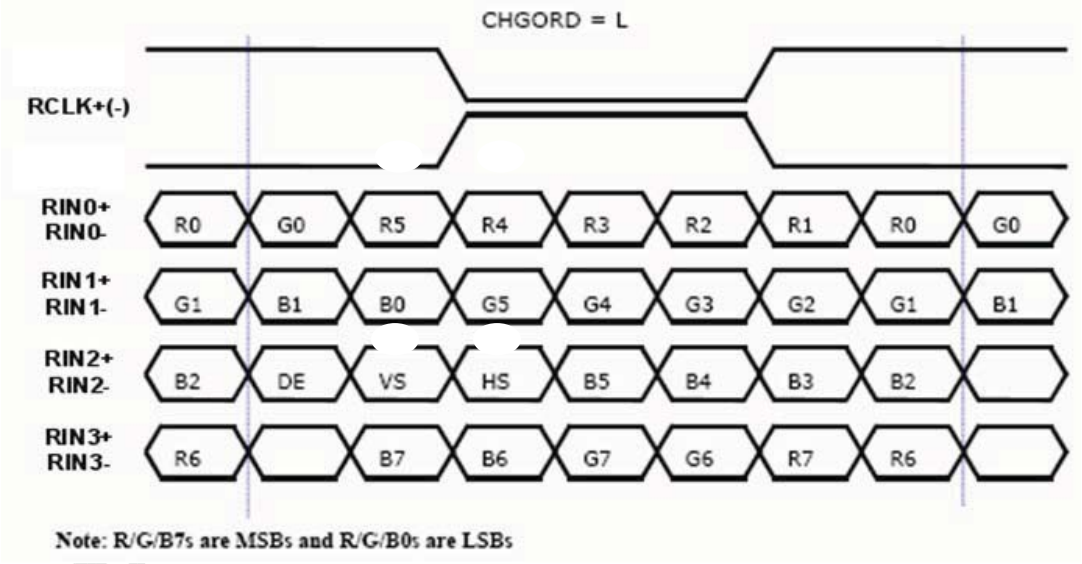
**LVDS Option = High**




**LVDS Option = Low or Open**

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## BACKLIGHT CONNECTOR PIN CONFIGURATION

### 1. Electrical specification

| | Description | | | Min | Typ | Max | Unit | Condition/Note |
|---|---|---|---|---|---|---|---|---|
| 1 | Operating Voltage | | Vo | 639 | 710 | 781 | Vrms | 1. Dimming range is set 100%<br>2. Base on lamp specification, for each lamp need to be applied at least minimum operating voltage to ensure each lamp can be normally worked! |
| 2 | Operating Current | | Io | 12 | 12.5 | 13 | mArms | 1. Dimming range is set 100%<br>2. Base on lamp specification, for each lamp need to be applied at least minimum operating current to ensure each lamp can be normally worked! |
| 3 | BL Total Power Dissipation | | PBL | 76 | **75** | 80 | Watt | 1. Dimming range is set 100%.<br>2. In order to get typical light out, the backlight need to be applied typical power.<br>3. Input power of JIG BD is about 75 W (typ) by AUO measure! |
| 4 | Striking Voltage | At 0℃ | Vstrike | 1500 | 1650 | | Vrms | 1. Base on lamp specification, to ensure each lamp can be normally ignited, need to apply at least minimum striking voltage to each lamp |
| | | At 25℃ | | 1350 | 1500 | | | |
| 5 | Striking Time | | Ts | 1000 | - | 1500 | msec | 1. To ensure each lamp can be normally ignited, each lamp need to be applied at least minimum striking voltage during minimum striking time. |
| 6 | Operating Frequency | | fo | | | | kHz | 1. Operating frequency is set by customer.<br>2. Need to double confirm display quality.(*) |
| 7 | PWM Operating Frequency | | F_PWM | 120 | 180 | 240 | Hz | 1. PWM frequency is set by customer.<br>2. Need to double confirm display quality.(*) |
| 8 | PWM Dimming Duty Ratio | | D_PWM | **20** | - | **100** | % | **Note 1. Dimming range**<br>**Note 2.**<br>**Note 3. Duty ratio definition.** |
| 9 | Lamp Type | | | U type | | | | |
| 10 | Number of Lamps | | | 4 | | | pcs | |

（Ta=25±5℃, Turn on for 45minutes）

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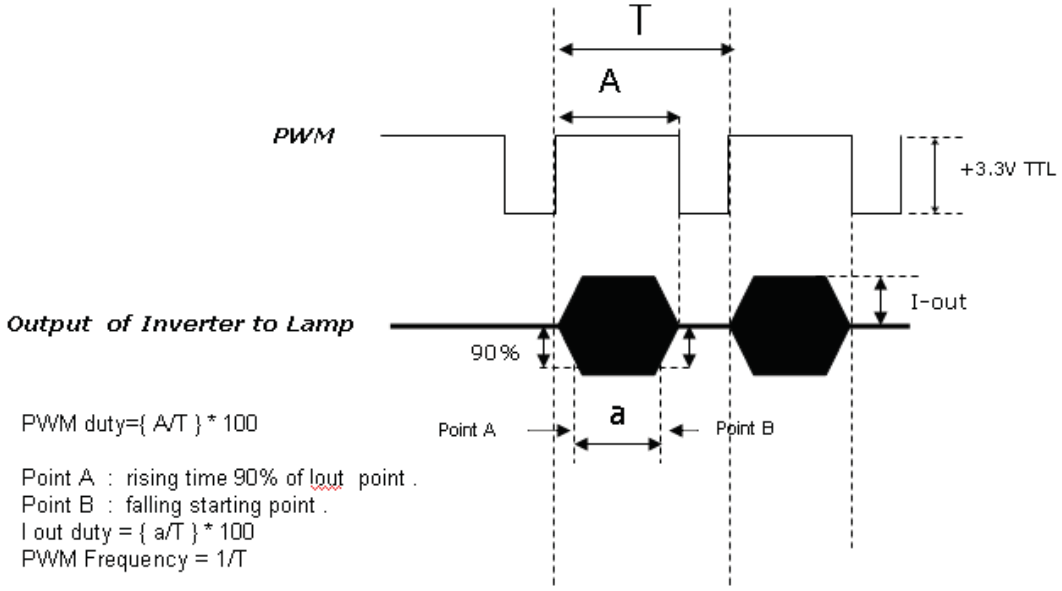
**Note 1:**
Dimming range

PWM Dimming : include Internal and External PWM Dimming

**Note 2:**
When PWM dimming ratio is operated within recommend value, backlight can be ensured that there is no flicker and uniformity issue and display quality of panel can be normally display!
When PWM dimming ration is operated less than recommend value, backlight need to be double confirmed display quality. LIPS need to be double confirmed feedback signal and all protection function!

**Note 3:**
Duty ratio definition.

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## 2. Lamp specification

| | Description | | Min | Typ | Max | Unit | Note |
|---|---|---|---|---|---|---|---|
| 1 | Lamp voltage | Vlamp | 639 | 710 | 781 | Vrms | At Ilamp=12.5mA |
| 2 | Lamp current | Ilamp | 12 | 12.5 | 13 | mArms | |
| 3 | Lamp frequency | flamp | 35 | - | 80 | kHz | |
| 4 | Striking voltage | At 25℃ | - | - | 1115 | Vrms | |
| | | At 0℃ | - | - | 1340 | Vrms | |
| 5 | Delayed discharge time | Tdelay | - | - | 1000 | msec | |
| 6 | Life time | | 50K | - | - | hr | |
| 7 | Unsymmetrical ratio | | - | - | 10% | - | Note 1. |
| 8 | Crest factor (C.F) | | $\sqrt{2}-10\%$ | $\sqrt{2}$ | $\sqrt{2}+10\%$ | - | |

The above characteristics are measured under the conditions:
Ambient temperature: 25±2℃,
Relative Humidity: 65±20%RH.

**Note 1:**

Please light on the lamp with symmetrical voltage and current waveform (unsymmetrical ratio is less than 10%, crest factor within $\sqrt{2}\pm10\%$ ).

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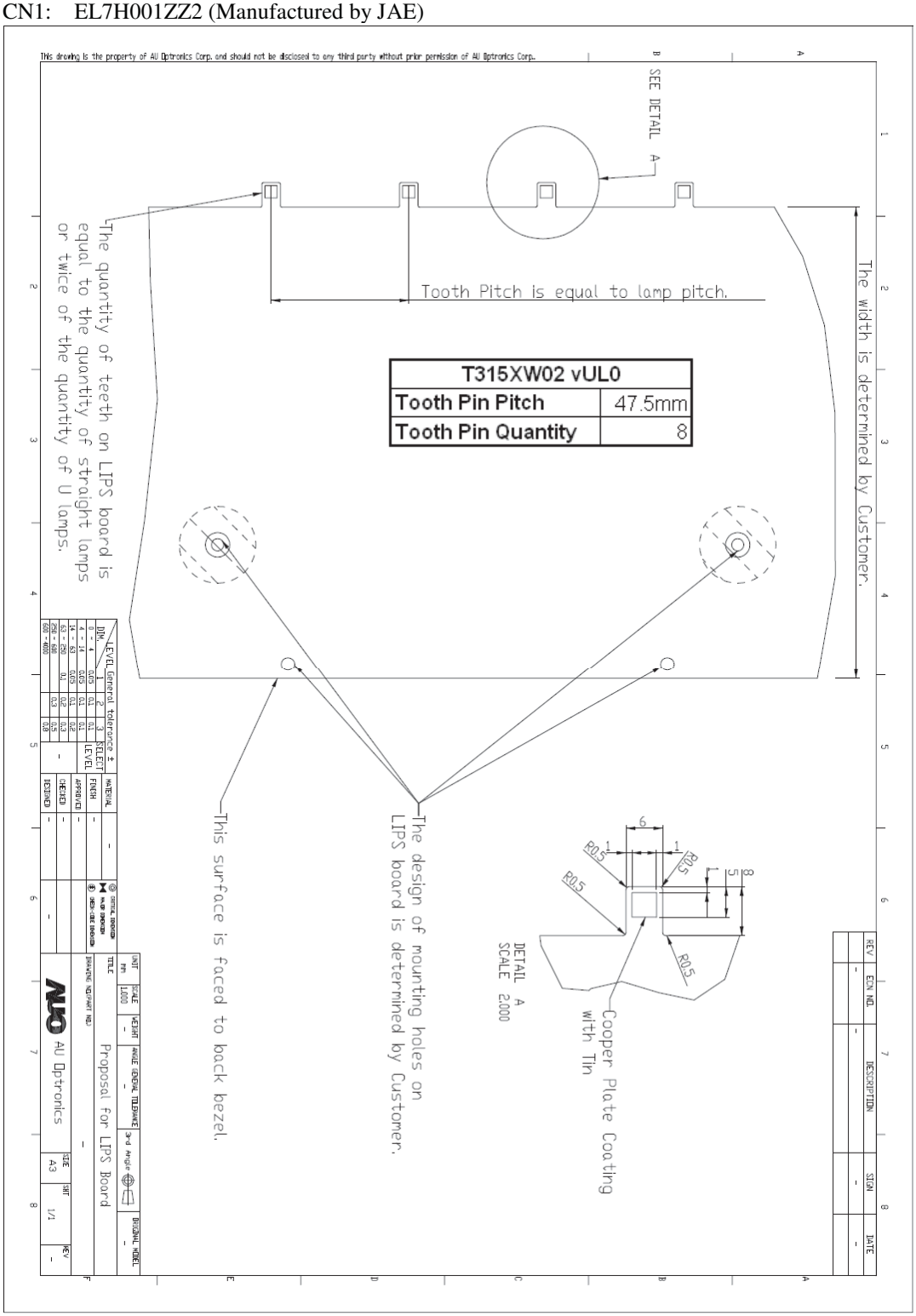
## Input Interface for LIPS board

CN1: EL7H001ZZ2 (Manufactured by JAE)

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## 3-3 Signal Timing Specifications

This is the signal timing required at the input of the User connector. All of the interface signal timing should be satisfied with the following specifications for it's proper operation.

* Timing Table

DE only Mode

Vertical Frequency:

| Signal | Item | Symbol | Min | Type | Max | Unit |
|---|---|---|---|---|---|---|
| Vertical Section | Period | Tv | 776 | 810 | 1015 | Th |
| | Active | Tdisp (v) | | 768 | | Th |
| | Blanking | Tblk (v) | 8 | 42 | 247 | Th |
| Horizontal Section | Period | Th | 1414 | 1648 | 2000 | Tclk |
| | Active | Tdisp (h) | | 1366 | | Tclk |
| | Blanking | Tblk (h) | 48 | 282 | 634 | Tclk |
| LVDS Clock | Frequency | 1/Tclk | 50 | 80 | 86 | MHz |
| Vertical Frequency | Frequency | Freq | 47 | 60 | 63 | Hz |
| Horizontal Frequency | Frequency | Freq | 43 | 48 | 53 | KHz |

Notes:
1.) Display position is specific by the rise of DE signal only.
Horizontal display position is specified by the rising edge of 1st DCLK after the rise of 1st DE, is displayed on the left edge of the screen.
Vertical display position is specified by the rise of DE after a "Low" level period equivalent to eight times of horizontal period. The 1st data corresponding to one horizontal line after the rise the of 1st DE is displayed at the top line of screen.
2.) If a period of DE "High" is less than 1366 DCLK or less than 768 lines, the rest of the screen displays black.
3.) The display position does not fit to the screen if a period of DE "High" and the effective data period do not synchronize with each other.

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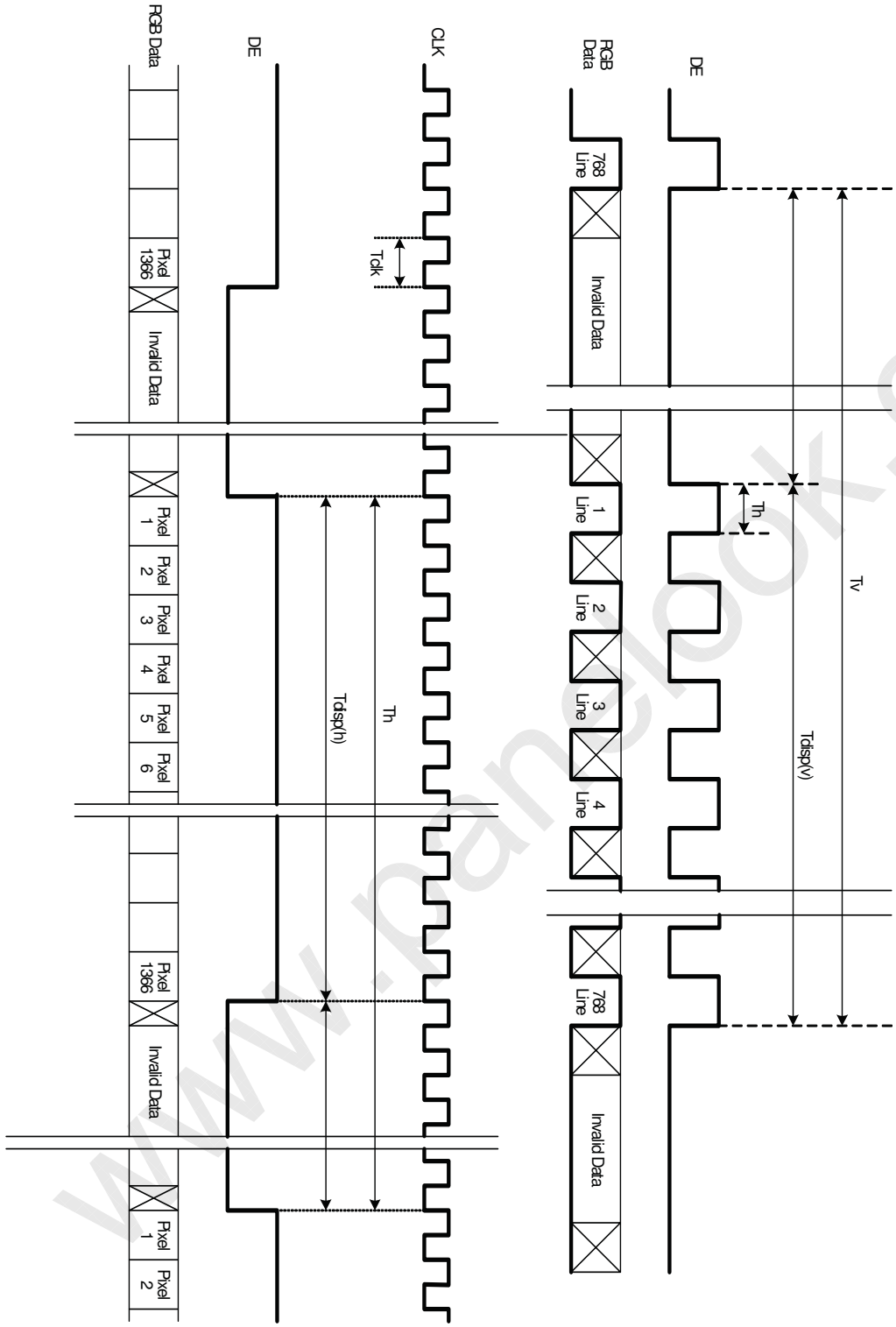
### 3-4 Signal Timing Waveforms

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### 3-5 Color Input Data Reference

The brightness of each primary color (red, green and blue) is based on the 8 bit gray scale data input for the color; the higher the binary input, the brighter the color. The table below provides a reference for color versus data input.

COLOR DATA REFERENCE

| Color | | Input Color Data | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | RED | | | | | | | | GREEN | | | | | | | | BLUE | | | | | | | |
| | | MSB | | | | | | | LSB | MSB | | | | | | | LSB | MSB | | | | | | | LSB |
| | | R7 | R6 | R5 | R4 | R3 | R2 | R1 | R0 | G7 | G6 | G5 | G4 | G3 | G2 | G1 | G0 | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |
| Basic Color | Black | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(255) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(255) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Blue(255) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Cyan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Magenta | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Yellow | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | White | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| RED | RED(000) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | RED(001) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ---- | | | | | | | | | | | | | | | | | | | | | | | | |
| | RED(254) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | RED(255) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| GREEN | GREEN(000) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | GREEN(001) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ---- | | | | | | | | | | | | | | | | | | | | | | | | |
| | GREEN(254) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | GREEN(255) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BLUE | BLUE(000) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | BLUE(001) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | ------- | | | | | | | | | | | | | | | | | | | | | | | | |
| | BLUE(254) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| | BLUE(255) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

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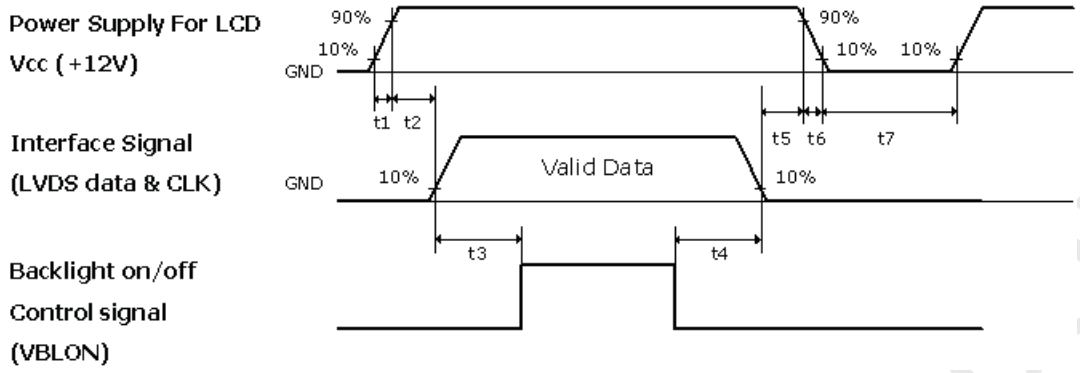
## 3-6 Power Sequence for LCD Module

### 3.6.1 Power Sequence for LCD




| Parameter | Values | | | Units |
|---|---|---|---|---|
| | Min. | Typ. | Max. | |
| t1 | 0.4 | - | 30 | ms |
| t2 | 0.1 | - | 50 | ms |
| t3 | 200 | - | - | ms |
| t4 | 10 | - | - | ms |
| t5 | 0.1 | - | 50 | ms |
| t6 | | - | 300 | ms |
| t7 | 500 | - | - | ms |

Note:

The timing controller will not be damaged in case of TV set AC input power suddenly shut down.

Once power reset, it should follow power sequence as spec. definition.

(1) Apply the lamp voltage within the LCD operation range. When the back-light turns on before the LCD operation or the LCD turns off before the back-light turns off, the display may momentarily become abnormal screen.

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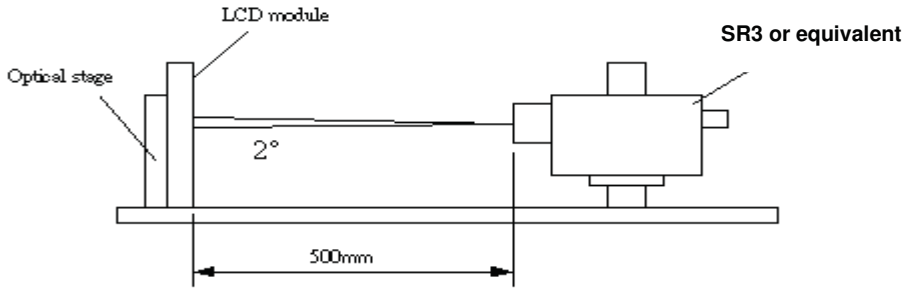
# 4. Optical Specification

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 45 minutes in a dark environment at 25℃. The values specified are at an approximate distance 50cm from the LCD surface at a viewing angle of Φ and θequal to 0°.

**Fig.1 1 presents additional information concerning the measurement equipment and method.**




| Parameter | | Symbol | Values | | | Units | Notes |
|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | | |
| Contrast Ratio | | CR | 2400 | 3000 | | | 1 |
| Surface Luminance, white | | LWH | 350 | 400 | | cd/㎡ | 2 |
| Luminance Variation | | $\delta_{WHITE}$ 9 p | | | 1.30 | | 3 |
| G to G Response time | | Tγ | | 6.5 | | ms | 4 |
| Color Gamut | | NTSC | | 72 | | % | |
| Color Coordinates | | | | | | | |
| | RED | $R_X$ | Typ.-0.03 | 0.64 | Typ.+0.03 | | |
| | | $R_Y$ | | 0.33 | | | |
| | GREEN | $G_X$ | | 0.28 | | | |
| | | $G_Y$ | | 0.60 | | | |
| | BLUE | $B_X$ | | 0.15 | | | |
| | | $B_Y$ | | 0.05 | | | |
| | WHITE | $W_X$ | | 0.28 | | | |
| | | $W_Y$ | | 0.29 | | | |
| Viewing Angle | | | | | | | |
| | x axis, right(φ=0°) | $\theta_r$ | | 89 | | Degree | 6 |
| | x axis, left(φ=180°) | $\theta_l$ | | 89 | | | |
| | y axis, up(φ=90°) | $\theta_u$ | | 89 | | | |
| | y axis, down (φ=0°) | $\theta_d$ | | 89 | | | |

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**Note**:

1. Contrast Ratio (CR) is defined mathematically as:

$$\textbf{Contrast Ratio} = \frac{\textbf{Surface Luminance of } L_{on5}}{\textbf{Surface Luminance of } L_{off5}}$$

Surface luminance is luminance value at point 5 across the LCD surface 50cm from the surface with all pixels displaying white. From more information see FIG 2. When VDDB = 24V, IDDB = 5A, $L_{WH}$=Lon5, where Lon5 is the luminance with all pixels displaying white at center 5 location.

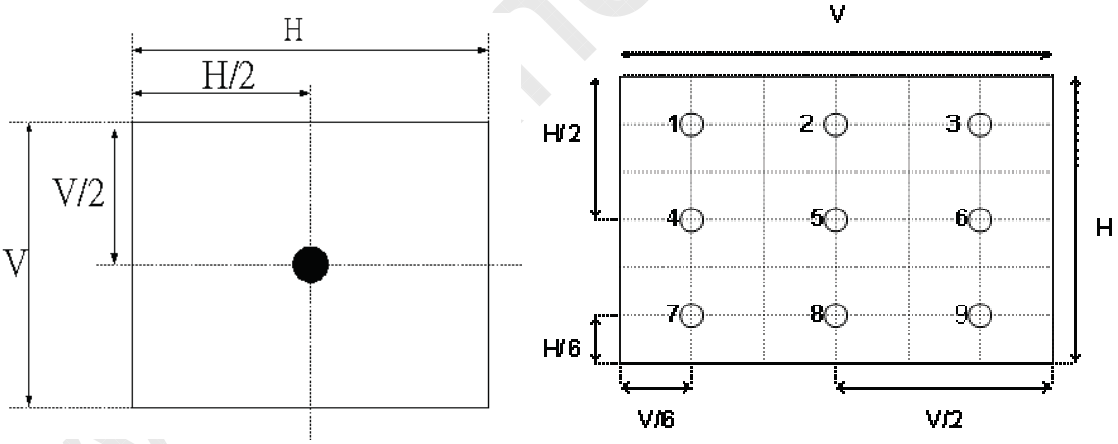
2. The variation in surface luminance, δWHITE is defined (center of Screen) as:

$$\delta_{WHITE(9P)} = \text{Maximum}(L_{on1}, L_{on2}, \ldots, L_{on9}) / \text{Minimum}(L_{on1}, L_{on2}, \ldots L_{on9})$$

3. Response time Tγ is the average time required for display transition by switching the input signal for five luminance ratio (0%,25%,50%,75%,100% brightness matrix) and is based on $f_v$=60Hz to optimize.

| | 0% | 25% | 50% | 75% | 100% |
|---|---|---|---|---|---|
| 0% | | t0%-25% | t0%-50% | t0%-75% | t0%-100% |
| 25% | t25%-0% | | t25%-50% | t25%-75% | t25%-100% |
| 50% | t50%-0% | t50%-25% | | t50%-75% | t50%-100% |
| 75% | t75%-0% | t75%-25% | t75%-50% | | t75%-100% |
| 100% | t100%-0% | t100%-25% | t100%-50% | t100%-75% | |

**FIG. 2 Luminance**

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4. Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see FIG3.

**FIG. 3 Response Time**

The response time is defined as the following figure and shall be measured by switching the input signal for "any level of gray(bright) " and "any level of gray(dark)".

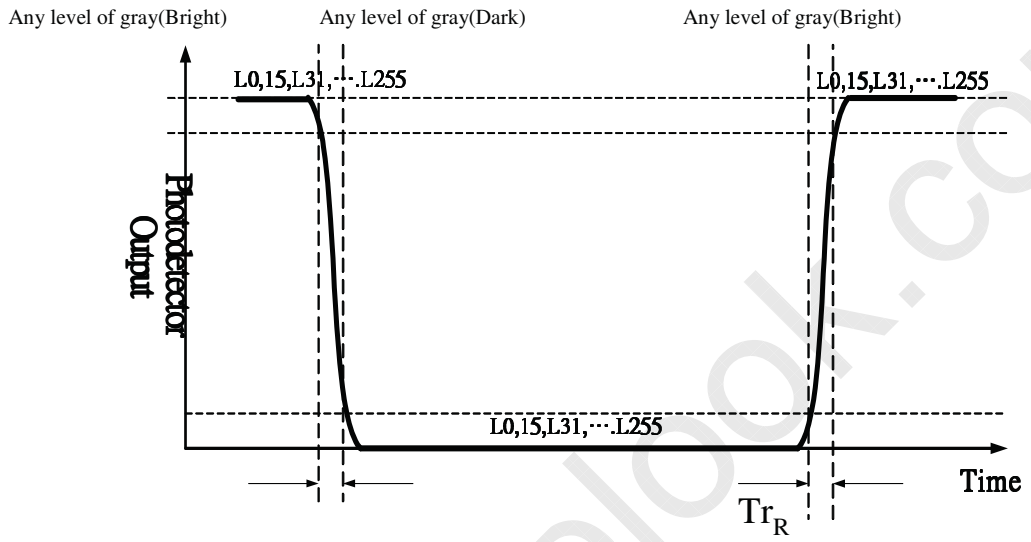
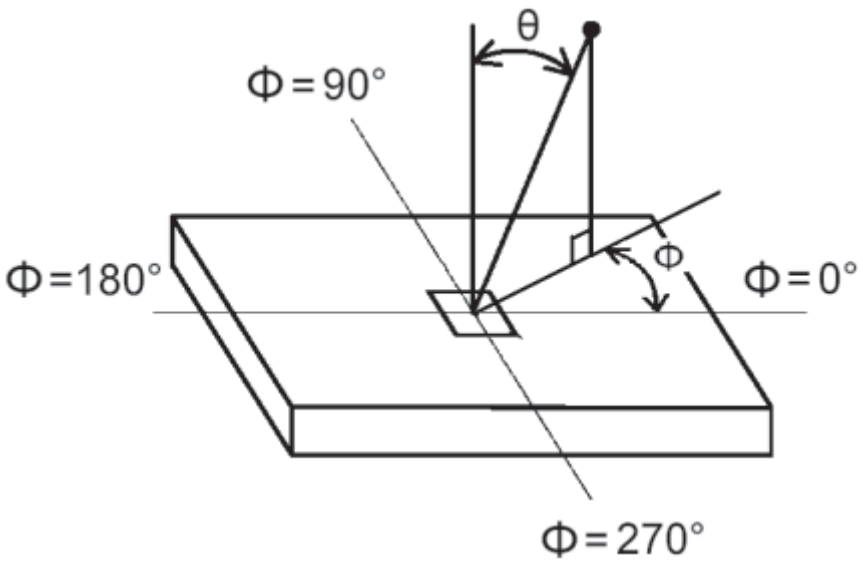



**FIG. 4 Viewing angle**

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# 5. Mechanical Characteristics

The contents provide general mechanical characteristics for the model T315XW02 VU. In addition the figures in the next page are detailed mechanical drawing of the LCD.

| | | |
|---|---|---|
| Outline Dimension | Horizontal | 760.0mm |
| | Vertical | 450.0mm |
| | Depth | 45mm |
| Bezel Opening | Horizontal | 703.6mm |
| | Vertical | 398.3mm |
| Active Display Area | Horizontal | 697.685mm |
| | Vertical | 392.256mm |
| Weight | 5900g Typ. | |
| Surface Treatment | AG, 3H | |

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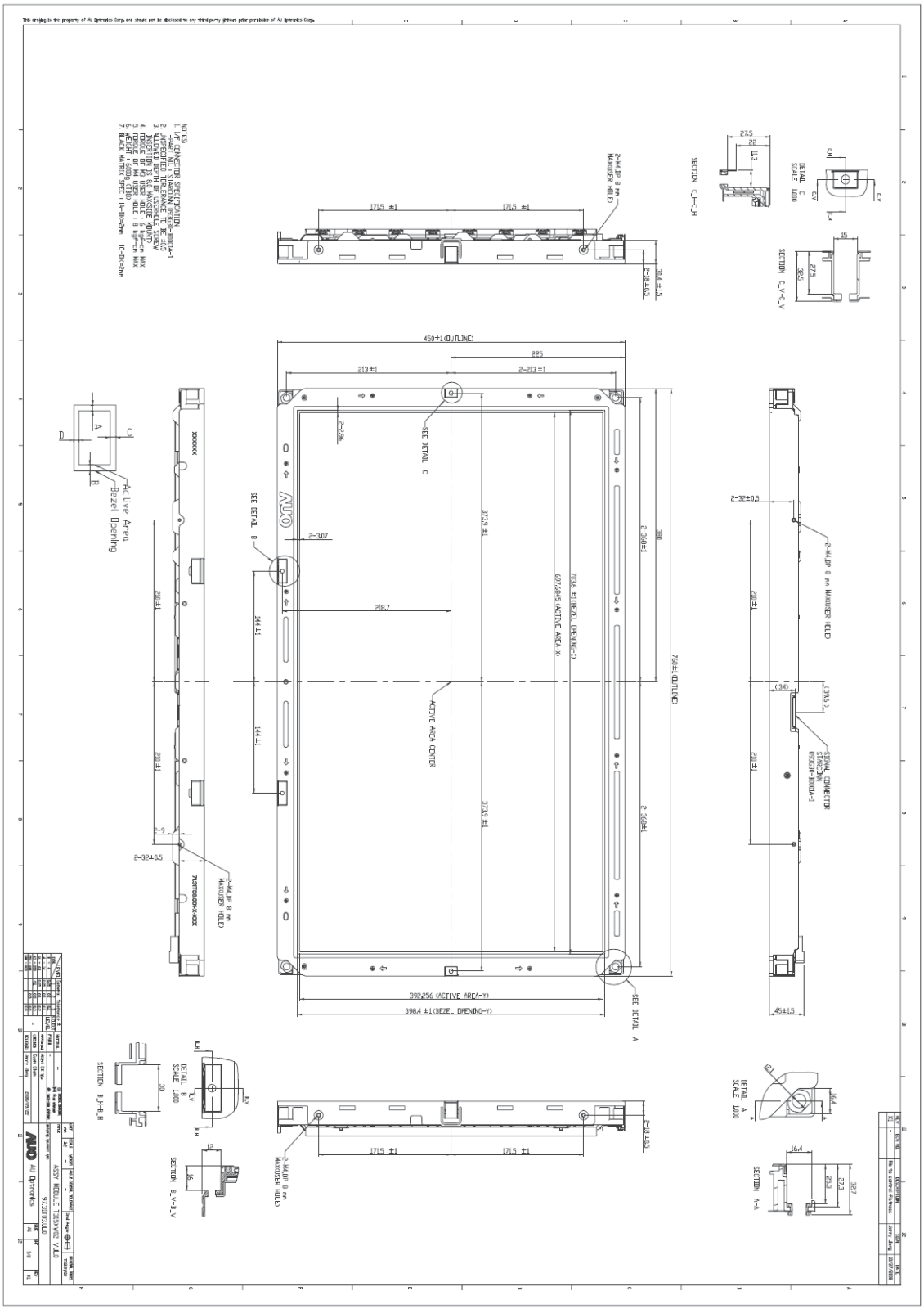
**Front:**



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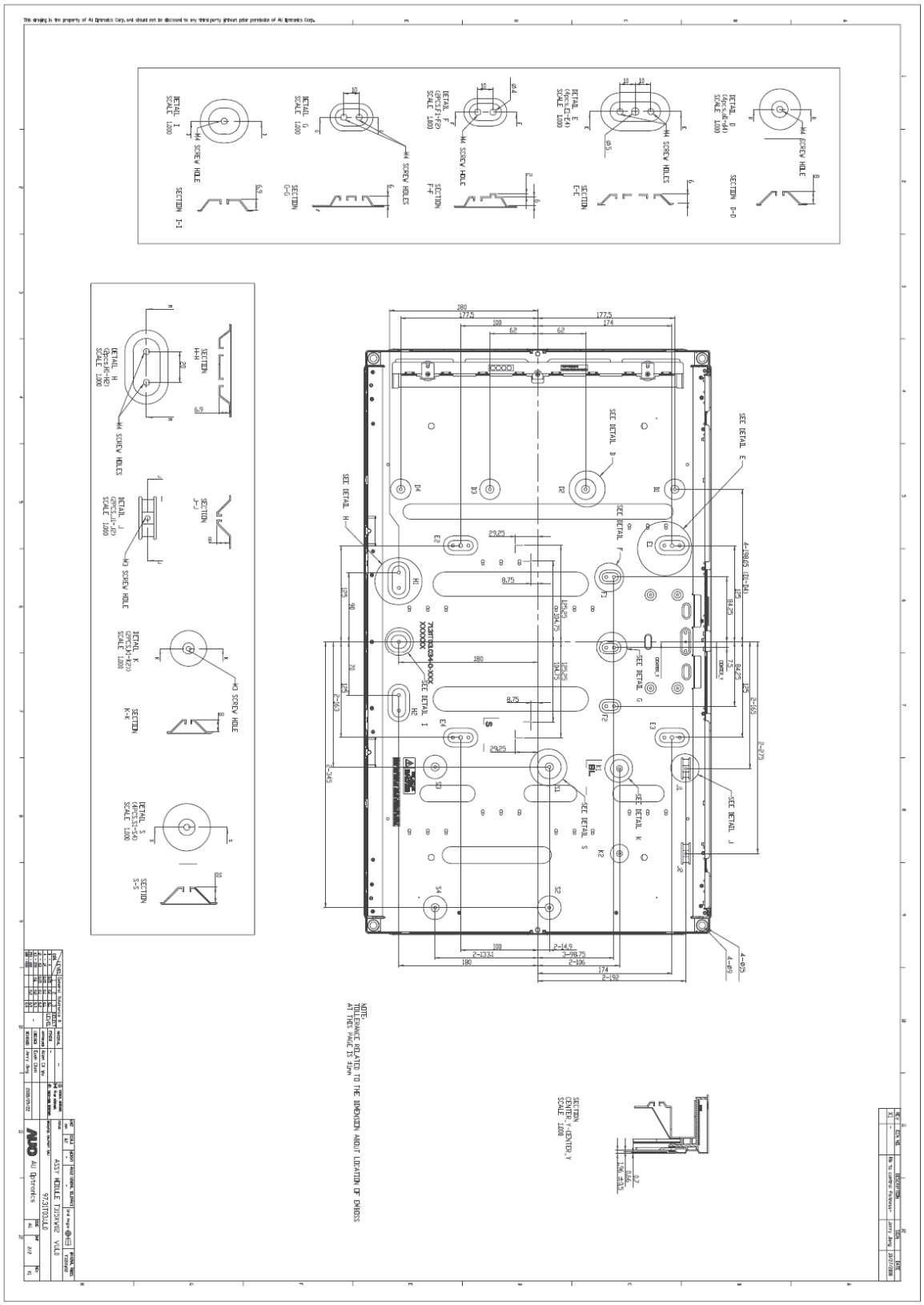
**Back:**



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# 6. Reliability:

Environment test condition

| No | Test Item | Condition |
|---|---|---|
| 1 | High temperature storage test | Ta=60℃ 300h |
| 2 | Low temperature storage test | Ta=-20℃ 300h |
| 3 | High temperature operation test | Ta=50℃ 300h |
| 4 | Low temperature operation test | Ta=-5℃ 300h |
| 5 | Vibration test<br>(non-operating) | "(10 ~ 300Hz/1.5G/11min SR, XYZ 30min/axis)<br>Vibration level : 1.5G RMS, Bandwidth : 10-300Hz<br>Duration: X, Y, Z 30min, " |
| 6 | Shock test<br>(non-operating) | Shock level: 50G<br>Waveform: half since wave, 11ms<br>Direction: ±X, ±Y, ±Z, one time each direction |
| 7 | Vibration test<br>(with carton) | Random wave (1.5 Grms 10~200Hz)<br>30mins / Per each X.Y.Z axes " |
| 8 | Drop test<br>(with carton) | Height: 38cm<br>1 corner, 3 edges, 6 surfaces<br>(ASTMD4169-I) |

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# 7. International Standard

## 7-1. Safety

(1) UL1950 Third Edition, Underwriters Laboratories, Inc. Jan. 28, 1995

Standard for Safety of Information Technology Equipment Including electrical Business Equipment.

(2) CAN/CSA C22.2 No. 950-95/60950 Third Edition, Canadian Standards Association,

Standard for Safety of Information Technology Equipment Including Electrical Business Equipment.

(3) EN60950 : 1992+A2: 1993+A2: 1993+C3: 1995+A4: 1997+A11: 1997

IEC 950: 1991+A1: 1992+A2: 1993+C3: 1995+A4:1996

European Committee for Electrotechnical Standardization (CENELEC)

EUROPEAN STANDARD for Safety of Information Technology Equipment Including Electrical Business Equipment.

## 7-2. EMC

a) ANSI C63.4 "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electrical Equipment in the Range of 9kHz to 40GHz. "American National standards Institute(ANSI), 1992

b) C.I.S.P.R "Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment." International Special committee on Radio Interference.

c) EN 55022 "Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment." European Committee for Electrotechnical Standardization. (CENELEC), 1998

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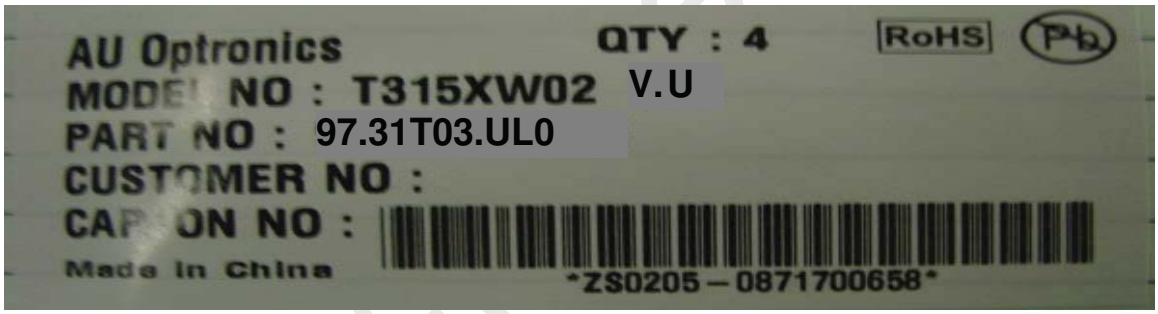
# 8. Packing

Panel label:

**AM8701402966-ZS0205**
AM87014: A: China
02966: Panel Serial Number
ZS0: AUO internal code
Manufactured 08/29: 2008 week 29
Made In China: China made

Carton Label:




Made In China: China Made

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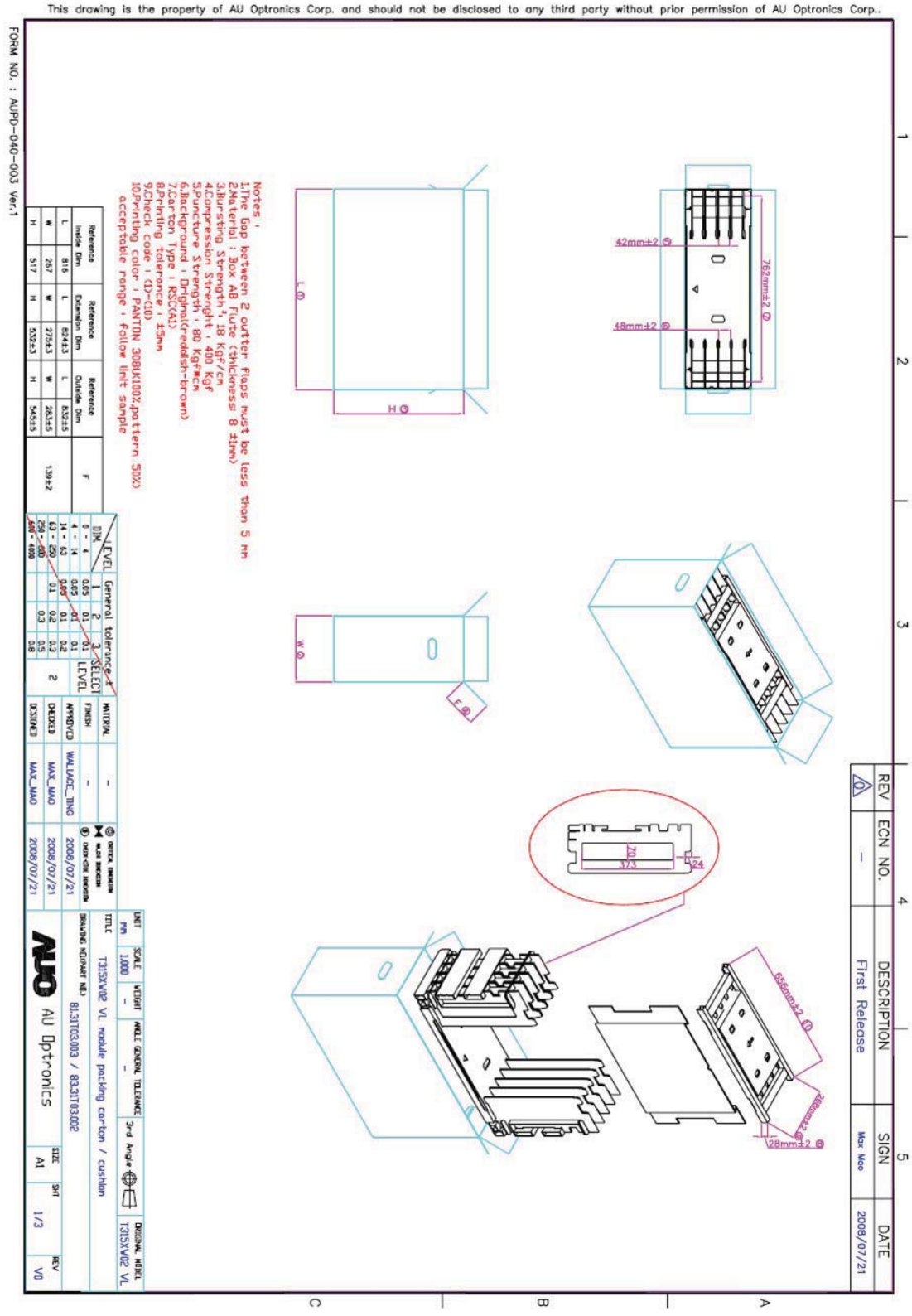
Carton:

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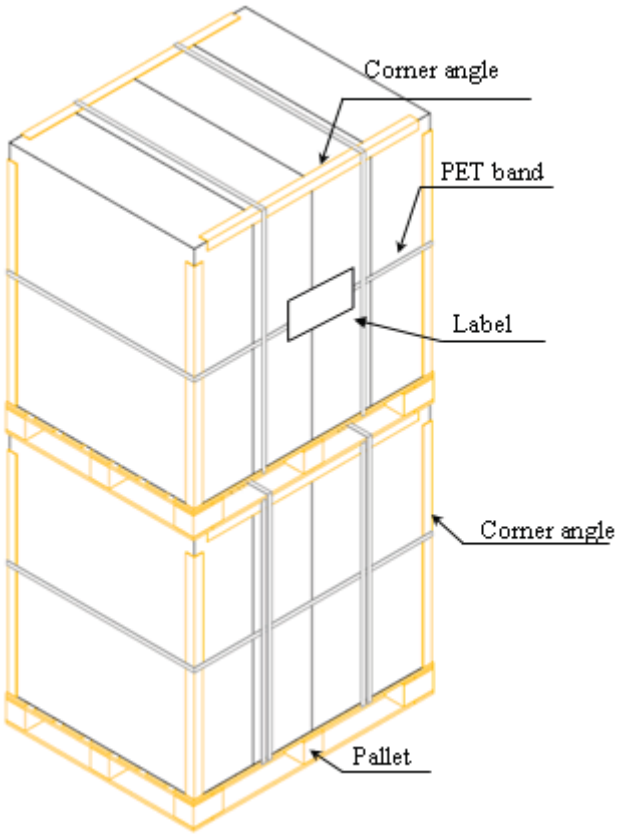
| | Item | Specification | | | Packing Remark |
|---|---|---|---|---|---|
| | | Qty. | Dimension | Weight (kg) | |
| 1 | Packing BOX | 4pcs/box | 832(L)mm*283(W)mm*545(H)mm | 30.5 | |
| 2 | Pallet | 1 | 1150(L)mm*840(W)mm*138(H)mm | 13 | |
| 3 | Boxes per Pallet | 8 boxes/Pallet | | | |
| 4 | Panels per Pallet | 32pcs/pallet | | | |
| | Pallet after packing | 32 | 1150(L)mm*840(W)mm*2460(H)mm | 256 | |

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# 9. PRECAUTIONS

Please pay attention to the followings when you use this TFT LCD module.

## 9-1 MOUNTING PRECAUTIONS

(1) You must mount a module using holes arranged in four corners or four sides.
(2) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.
(3) Please attach the surface transparent protective plate to the surface in order to protect the polarizer. Transparent protective plate should have sufficient strength in order to the resist external force.
(4) You should adopt radiation structure to satisfy the temperature specification.
(5) Acetic acid type and chlorine type materials for the cover case are not desirable because the former generates corrosive gas of attacking the polarizer at high temperature and the latter causes circuit break by electro-chemical reaction.
(6) Do not touch, push or rub the exposed polarizer with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment. Do not touch the surface of polarizer for bare hand or greasy cloth. (Some cosmetics are detrimental to the polarizer.)
(7) When the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with petroleum benzene. Normal-hexane is recommended for cleaning the adhesives used to attach front/ rear polarizer. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.
(8) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
(9) Do not open the case because inside circuits do not have sufficient strength.

## 9-2 OPERATING PRECAUTIONS

(1) The device listed in the product specification sheets was designed and manufactured for TV application
(2) The spike noise causes the mis-operation of circuits. It should be lower than following voltage: V=±200mV(Over and under shoot voltage)
(3) Response time depends on the temperature. (In lower temperature, it becomes longer..)
(4) Brightness depends on the temperature. (In lower temperature, it becomes lower.) And in lower temperature, response time (required time that brightness is stable after turned on) becomes longer.
(5) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
(6) When fixed patterns are displayed for a long time, remnant image is likely to occur.
(7) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interface.

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## 9-3 ELECTROSTATIC DISCHARGE CONTROL

Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don't touch interface pin directly.

## 9-4 PRECAUTIONS FOR STRONG LIGHT EXPOSURE

Strong light exposure causes degradation of polarizer and color filter.

## 9-5 STORAGE＋

When storing modules as spares for a long time, the following precautions are necessary.

(1) Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5℃ and 35℃ at normal humidity.

(2) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.

## 9-6 HANDLING PRECAUTIONS FOR PROTECTION FILM

(1) The protection film is attached to the bezel with a small masking tape. When the protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.

(2) When the module with protection film attached is stored for a long time, sometimes there remains a very small amount of flue still on the Bezel after the protection film is peeled off.

(3) You can remove the glue easily. When the glue remains on the Bezel or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with normal-hexane.

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